

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GARY C. BJORKLUND,
WILLIAM E. MOERNER, and
SCOTT M. SILENCE

Appeal No. 1997-3528
Application No. 08/230,659

ON BRIEF

Before PAK, OWENS, and DELMENDO, Administrative Patent Judges.
DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 11 through 14 and 17 through 20, which are all of the claims pending in the subject application. Claims 15 and 16 were canceled in an amendment filed subsequent to the final rejection. (Paper 9 filed July 31, 1995; Paper 11 mailed August 30, 1995.)

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Claim 11 is illustrative of the claims on appeal and is reproduced below:

11. A process for holographic storage in a photorefractive polymeric optical article comprising a polymer and a non linear optical chromophore comprising the steps of (i) exposing the article to electromagnetic radiation having an intensity of at least 0.05 W/cm^2 to obtain an absorbed energy/unit volume of at least $1 \times 10^4 \text{ J/cm}^3$ from said radiation to activate the article without forming an index grating and (ii) exposing said article to an external electric field and electromagnetic radiation to cause formation of an index grating provided one of the step (i) or step (ii) exposures is with two intersecting beams of coherent electromagnetic radiation and the other step exposure is a flood exposure.

The subject matter on appeal relates to a process for holographic storage in a photorefractive polymeric optical article comprising the recited steps (i) and (ii). According to the appellants, "[t]he key feature of the present invention" is to expose the article to a particular level of electromagnetic radiation without forming an index grating so as "to activate the article and enhance subsequent index grating formation in the article during the writing process." (Principal appeal brief, pages 3-4.)

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The examiner relies upon the following prior art references as evidence of unpatentability:

Ducharme et al. (Ducharme)	5,064,264	Nov. 12, 1991
Bjorklund et al. (Bjorklund)	5,361,148	Nov. 1, 1994
	(filed Jan. 21, 1993)	

C. A. Walsh and W. E. Moerner (Walsh), Two-Beam Coupling Measurements of Grating Phase in a Photorefractive Polymer, Vol. 9 *J. Opt. Soc. Am. B*, No. 9, 1642-47 (September 1992).

Claims 11, 13, 14, and 17 through 20 stand rejected under the first paragraph of 35 U.S.C. § 112 on the ground that "the specification as originally filed fails to provide support" for certain language recited in appealed claim 11.

(Examiner's answer, page 4.) Also, claims 11, 12, 14, and 17 through 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Ducharme in view of Bjorklund. (Examiner's answer, pages 4-6.) Further, claims 11, 12, 14, and 17 through 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Bjorklund in view of Walsh. (Examiner's answer, pages 6-7.)¹

¹ The examiner has withdrawn: (1) the rejection of claims 11, 13-17, 19, and 20 under 35 U.S.C. § 102(b) as anticipated

We have carefully reviewed the entire record, including all of the arguments and evidence presented by both the examiner and the appellants in support of their respective positions. This review leads us to conclude that the examiner's rejections are not well founded. Accordingly, we reverse all of the aforementioned rejections. The reasons for our determination follow.

A. Rejection under 35 U.S.C. § 112, First Paragraph

In rejecting claims 11, 13, 14, and 17 through 20 under the first paragraph of 35 U.S.C. § 112, the examiner states that "the specification as originally filed fails to provide support for the language 'to activate the article without

by or, in the alternative, under 35 U.S.C. § 103 as obvious over Lawandy (U.S. Patent 5,028,109); (2) the rejection of claims 11-17, 19, and 20 under 35 U.S.C. § 103 as unpatentable over Ducharme in view of W. E. Moerner et al., *Photorefractivity in Doped Nonlinear Organic Polymers*, SPIE PROCEEDINGS 278 (1991); and (3) the rejection of claims 11, 13-17, 19, and 20 under 35 U.S.C. § 103 as unpatentable over Schildkraut et al. (U.S. Patent 4,999,809). (Examiner's answer, p. 2.) In addition, the examiner has also withdrawn the rejection of claim 13 on prior art grounds. (Id.)

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forming an index grating' added to independent claim 11."²

(Examiner's answer, page 4.) Specifically, the examiner alleges:

The specification, while supporting the flood exposure and the interferometric exposure occurring with either taking place before the other, does not contain support for the language added to the claim, particularly when the first exposure is interferometric as embraced by claim 13, while being exposed to an external applied field as taught in the specification at page 5 in lines 5-7. The prior art clearly establishes that an interferometric exposure is necessary for grating formation and a two beam exposure precedes the formation of the grating and that application of a field during this exposure results in grating formation. [Examiner's answer, p. 4.]

According to the examiner, the insertion of the language into claim 11 introduces "new matter." (Examiner's answer, page 2.) Thus, the examiner's rejection appears to be based on the written description requirement of 35 U.S.C. § 112, first paragraph.

² The recitation "to activate the article without forming an index grating" was inserted into claim 11, step (i), through an amendment filed February 9, 1995. (Paper 7.)

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In order for a claim to satisfy the written description requirement, the original application must reasonably convey to those skilled in the relevant art that the applicants, as of the filing date of the application, had possession of the claimed invention. In re Alton, 76 F.3d 1168, 1172, 37 USPQ2d 1578, 1581 (Fed. Cir. 1996); In re Kaslow, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)). However, the written description requirement does not require the applicants to describe exactly the subject matter claimed in the original application. Instead, the description must clearly allow persons of ordinary skill in the art to recognize that the applicants invented what is claimed. In re Gosteli, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989).

As pointed out by the appellants on page 6 of their principal brief, the specification provides the following description:

The exposure of the polymeric article to electromagnetic radiation **prior to forming the index grating** in the article surprisingly results in substantially increasing the diffraction efficiency of the optical article and also decreasing the decay rate of the diffraction efficiency of the optical article. [Emphasis added; p. 14, ll. 4-7.]

From this description, one skilled in the relevant art would recognize that the applicants invented a process in which the polymeric article is exposed to electromagnetic radiation "prior to forming the index grating." Additionally, the specification describes the process as comprising the steps of: (i) exposing the article to a certain level of electromagnetic radiation to activate the article and (ii) exposing the article to an external electric field and electromagnetic radiation to form the index grating.

(Specification, pages 4-5.) It follows then that the specification adequately describes a process in which step (i) involves exposing the article to a certain level of electromagnetic radiation without the formation of an index grating. We therefore determine that, in compliance with the first paragraph of 35 U.S.C. § 112, the specification provides adequate written description for the invention recited in appealed claim 11.

B. Rejection under 35 U.S.C. § 103: Ducharme in view of Bjorklund

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Claims 11, 12, 14, and 17 through 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Ducharme in view of Bjorklund.

In any rejection, whether it be based on prior art grounds or any other ground, the initial burden of presenting a prima facie case of unpatentability rests on the examiner.

In re

Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). In this case, the examiner has failed to meet his burden of proof.

The examiner states that Ducharme "teaches the invention substantially as claimed" but admits that Ducharme does not teach the "levels of irradiation" recited in appealed claim 11. (Examiner's answer pages 5-6.) Nevertheless, the examiner relies on the teachings of Bjorklund, together with certain calculations based on assumptions, to make up for the difference between the claimed subject matter and Ducharme. (Examiner's answer, page 6.) Specifically, the examiner's position is stated as follows:

It would have been obvious to one skilled in the art that the process described by Bjorklund et al. '148 for measuring photoconductivity **may well have been**

that used in the measurements of Ducharme et al.
'264 since there are inventors in common and these measurements were made at IBM facilities and that an irradiation time exceeding 12 minutes **may have been** reached when recognizing that several measurements are commonly made and averaged to produce a more reproducible and accurate value for the photoconductivity. [Emphases added; id.]

Even if we consider the collective teachings of the applied prior art references in the light most favorable to the examiner, they are insufficient to establish a prima facie case of obviousness within the meaning of 35 U.S.C. § 103 against appealed claim 11.

Ducharme describes an amorphous or substantially amorphous erasable photorefractive material comprising a polymer, a non-linear optical chromophore, and a charge transport agent. (Column 2, lines 25-32.) Also, Ducharme teaches that the photoconductivity of the material may be determined by applying a voltage across the material and measuring with an ammeter the additional current that results when the material is illuminated. (Column 10, lines 37-41 and column 14, lines 28-42.) Further, Ducharme discloses that the photorefractive diffraction efficiency can be measured by using two mutually coherent interfering writing beams and a

reading beam, although "the sample could only be read out with an external electric field applied to establish the nonlinearity." (Column 14, line 65 to column 15, line 35.)

Bjorklund describes a process for producing net gain in photorefractive two beam coupling comprising exposing a polymeric optical article to an external electric field and two intersecting beams of coherent electromagnetic radiation. (Column 2, lines 30-35.) According to Bjorklund, the optical article comprises: (i) at least 50% by weight of a charge transporting polymer having an absorption coefficient at the wavelength of the incident radiation of less than 0.1 cm^{-1} ; (ii) a non-linear optical chromophore which, when oriented by the external electric field, imparts to the optical article at the wavelength of incident radiation sufficient optical nonlinearity to provide a change in the optical index of refraction per unit electric field of greater than $0.1 \text{ picometer per volt}$; and (iii) a sensitizer. (Column 2, lines 35-45.) In example 2, for instance, Bjorklund teaches that the photoconductivity of the article was demonstrated by placing a 500 V bias across the sample and measuring the

increase in the current when the sample was irradiated with 100 mW of monochromatic 753 nm light with a spot size of 3 mm.

Bjorklund, however, does not teach the suitable time periods for irradiation. As pointed out by the appellants (reply brief filed February 12, 1996, page 2), Bjorklund does not teach or suggest irradiating the article to an intensity of at least 0.05 W/cm^2 to obtain an absorbed energy/unit volume of at least $1 \times 10^4 \text{ J/cm}^3$ to activate the article without forming an index grating. Indeed, Bjorklund states that the article is irradiated for the purpose of demonstrating the photoconductivity, not for the purpose of activating the article. Here, the examiner has not pointed to any evidence showing that suitable irradiation times, for the purpose of measuring photoconductivity, are the same as or overlap the irradiation times needed for activation to meet the radiation intensity and absorbed energy/volume limitations recited in appealed claim 11.

For these reasons, we hold that the collective teachings of Ducharme and Bjorklund do not establish a prima facie case of obviousness against the subject matter of appealed independent claim 11 within the meaning of 35 U.S.C. § 103.

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Since appealed claims 12, 14, and 17 through 20 all depend from claim 11, it follows that the subject matter of these dependent claims would also not have been obvious over the applied prior art references. In re Fine, 837 F.2d 1071, 1076, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

C. Rejection under 35 U.S.C. § 103: Bjorklund in view of Walsh

Similarly, in the §103 rejection of claims 11, 12, 14, and 17 through 20 over the combined teachings of Bjorklund and Walsh, the examiner alleges:

It would have been obvious to one skilled in the art that an irradiation time exceeding 12 minutes **may have been** reached by Bjorklund et al. '148 when measuring the photoconductivity when recognizing that several measurements are commonly made and averaged to produce a more reproducible and accurate value for the photoconductivity and to measure the photoconductivity first and that a higher intensity for the Kr⁺ laser may be used based upon the teaching of higher output from the same type of laser in a single line mode. [Emphasis added; examiner's answer, p. 7.]

As we discussed above, however, Bjorklund does not teach or suggest irradiating the article to an intensity of at least 0.05 W/cm² to obtain an absorbed energy/unit volume of at least 1 x 10⁴ J/cm³ to activate the article without forming an

index grating. Nor does Bjorklund describe the irradiation times for measuring the photoconductivity of the article.

Walsh describes the use of two-beam coupling to study the grating properties, as a function of electric field, of a particular photorefractive polymer, i.e. nonlinear epoxy polymer bis-phenol-A-diglycidyl ether 4-nitro-1,2-phenylenediamine, doped with 30 wt.% of diethylamino-benzaldehyde diphenylhydrazone. (Page 1642.) However, Walsh does not make up for the difference between the appellants' claimed invention and Bjorklund. It is not clear to us how the measurement of grating properties as described in Walsh is relevant to the measurement of photoconductivity as described in Bjorklund. In short, there is no teaching, suggestion, or motivation in Walsh to carry out Bjorklund's photoconductivity measurements for a time sufficient to meet the radiation intensity and absorbed energy/unit volume limitations of appealed claim 11.

We therefore hold that the collective teachings of Bjorklund and Walsh also do not establish a prima facie case of obviousness against the subject matter of appealed claim 11. Since appealed claims 12, 14, and 17 through 20 all

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depend from claim 11, it follows that the subject matter of these dependent claims would also not have been obvious over the applied prior art references. Fine, 837 F.2d at 1076, 5 USPQ2d at 1600.

For the reasons set forth above and in the appeal brief and reply briefs, we reverse (1) the rejection of claims 11, 13, 14, and 17 through 20 under the first paragraph of 35 U.S.C. § 112, (2) the rejection of claims 11, 12, 14, and 17 through 20 under 35 U.S.C. § 103 as unpatentable over Ducharme in view of Bjorklund, and (3) the rejection of claims 11, 12, 14, and 17 through 20 under 35 U.S.C. § 103 as unpatentable over Bjorklund in view of Walsh.

The decision of the examiner is reversed.

REVERSED

CHUNG K. PAK)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
TERRY J. OWENS)	APPEALS

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Administrative Patent Judge)	AND
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